REMARKS

These amendments and remarks supplement the Amendment filed March 23, 2005, and are being filed in response to the Office Action dated November 23, 2004. For the following reasons, this application should be allowed and the application passed to issue.

No new matter is introduced by this amendment. The amendment is supported by the specification at page 8, lines 18 to page 9, line 13; and page 14, line 13 to page 16, line 34 (Second Embodiment). The Second Embodiment expressly discloses the following sets of amorphous content and crystallizing temperature and time: (50%, 600 °C, 10 min), (60%, 600 °C, 10 min), and (50%, 650 °C, 5 min). Applicants submit that in view of this amendment, remarks, the supporting Declaration under 37 C.F.R. § 1.132 filed concurrently with this supplemental amendment, and the supporting Declaration under 37 C.F.R. § 1.132 filed November 10, 2004, that this application is in condition for allowance.

Claims 5-12, 14, and 16 are pending in this application. Claims 5-12 have been withdrawn. Claims 14-19 have been rejected. Claim 14 has been amended in this paper. Claims 1-4, 13, 15, and 17-19 have been cancelled.

Claim Rejections Under 35 U.S.C. §§ 102 And 103

Claims 14-19 are rejected under 35 U.S.C. § 102(e) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Nomura et al. (U.S. Patent No. 6,261,385). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention as claimed and the cited prior art.

An aspect of the invention, per claim 14, is an anisotropic exchange spring magnet powder made by a process comprising the steps of preparing a crystalline mother material containing a hard magnetic material phase including neodymium (Nd), iron (Fe), and boron (B).

The mother material further contains a soft magnetic material phase including iron (Fe) and boron (B). The content of the neodymium (Nd) is from 2 to 15 atomic % of the crystalline mother material, and the content of the boron (B) is from 1 to 25 atomic % of the crystalline mother material. The crystalline mother material has a content of amorphous parts of below about 60%. The crystalline mother material is amorphized and subsequently crystallized. The amorphising process is conducted by a ball mill method comprising mixing the crystalline mother material in a stainless steel ball mill pot together with stainless steel balls and cyclohexane as a solvent under an atmosphere of argon. The crystalline mother material is milled, so as to allow ultrafine crystal particles in each crystal grain of the mother crystal material to remain in an amorphous mixture. The crystallizing process is conducted by heat treating at a temperature within in a range of about 600 °C to about 650 °C for a time within a range of about 5 minutes to about 10 minutes under vacuum, so as to allow the ultrafine particles to grow continuously during the crystallizing process.

The Examiner asserted that Nomura teaches an anisotropic rare earth magnet consisting of a hard magnetic phase and a soft magnetic phase containing a rare earth metal, a transition metal, and nitrogen or boron. The Examiner alleged that Nomura defines the crystal size of the nanocomposite as being "several tens of nanometers." The Examiner acknowledged that Nomura does not disclose the process steps recited in the claims. Characterizing the claims as product-by-process claims, the Examiner maintained that the prior art product appears to be identical or only slightly different from the claimed product, and therefore a rejection under 35 U.S.C. §§ 102 and 103 was acceptable.

In the "Response to Arguments" section of the Office Action, the Examiner argued that the declaration filed November 10, 2004, is insufficient to overcome the rejection of claims 14 to

19 based upon Nomura because there is only one example of the claimed invention in the present data. . . . the data is not considered to be commensurate in scope to the claims.

Further, the Examiner argued that:

> Nomura's alloy is disclosed as a nanocomposite and Nomura defines the crystal size of a nanocomposite as being "several tens of nanometers" (column 2, lines 40 to 45) which overlaps the instantly disclosed grain size of "150 nm or less" of applicant's alloy.

In response to the Examiner's arguments, claim 14 has been amended, and is commensurate in scope with the concurrently filed Shimada declaration.

Applicants submit that Nomura does not disclose or suggest a magnet powder made by a process having **crystal sizes on the order of several tens of nanometers,** as explained in the Amendment filed March 23, 2005.

Furthermore, as demonstrated in the Shimada declaration filed concurrently with this Amendment, the crystal size of the nanocomposite magnet powder obtained using the plasma irradiation method is about 100 nm and the coercive force is about 1.9 kOe. In contrast thereto, the nanocomposite magnet powder produced by the ball mill method, as required by claim 14, has a crystal size of about 50 nm and a coercive force of about 4.1 kOe. Thus, the claimed method produces an unexpected improvement in crystal size and coercive force of the nanocomposite magnet powder.

As is clear from the comparison of Figure 1 with Figure 2, the crystal size of the magnet powder obtained by the claimed invention is smaller than that obtained by the Nomura's Example 3. This means that the magnet powder of the claimed invention has a larger coercive force than that of Nomura because coercive force is a decreasing function of the crystal size of a magnet powder. In general, the coercive force is one of important indexes indicating the physical qualities of magnet powder. The **smaller** the crystal size of the magnet powder the

stronger the coercive force. The strength of the coercive force of magnets obtained from the present invention is greater than twice of that of comparison method. Magnet powder obtained by the claimed invention is higher quality than that obtained by Nomura. The difference in the strength of coercive force is caused by the difference of step 5 of Nomura and steps 5 and 6 of the instant invention (as described in the Shimada declaration). In particular, the difference of temperature (900 °C) of step 5 of Nomura and step 6 (about 600 °C to about 650 °C) of the instant invention is essential for the difference in the strength of coercive force.

Because magnet powder produced according to the present invention is clearly different from the Nomura magnet powder and the difference is unexpected and unobvious, Applicants submit that the rejection of the instant claims under 35 U.S.C. §§ 102 and 103 as a product-by-process rejection is overcome by the showing in the two declarations.

The quenched ribbon produced by the Nomura process is 100% amorphous, while the crystalline mother material of claim 14 has an amorphous content below about 60%. Consequently, a compressing process is required to obtain the nanocomposite magnet powder from the Nomura powder, while the mother material of claim 14 is amorphised and crystallized. The amorphising process amorphises crystals remaining in the pulverized powder generating ultrafine crystals distributed throughout the powder. The ultrafine crystals grow continuously during the crystallizing process. As a result, an anisotropic exchange spring magnet powder that has crystal particles with diameters of about 50 nm is obtained.

In the present invention, unlike the prior art, the amorphising process allows ultrafine crystal particles in each crystal grain of the mother crystal material to remain in an amorphous mixture, and thereby allows the ultrafine crystal particles to grow continuously during the

crystallizing step. Thus, the ball mill method of the present claims generates the unexpected results demonstrated in the Shimada declarations.

Furthermore, the present invention does not include the compression step required by Nomura. Anisotropic exchange spring magnet powder is obtained from the Nomura process by compressing the powder. The present invention obtains exchange spring magnet powder by amorphising and crystallizing processes. Thus, the anisotropic magnet powder of the present invention is obtained by the principle of crystal growth.

In light of the above Remarks, this application should be allowed, and the case passed to issue. If there are any questions regarding these remarks or the application in general, a telephone call to the undersigned would be appreciated to expedite prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT WILL & EMERY LLP

Bernard P. Codd

Bernard P. Codd
Registration No. 46,429

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 BPC:kap
Facsimile: 202.756.8087
Date: July 26, 2005

Please recognize our Customer No. 20277 as our correspondence address.